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Evaluation of the 1992 and 1993 Arctic Grayling (Thymallus Arcticus) Transplants to Little Calais Lake and Current Fish Population Status, 1998

A. R. Langston
April 1999

PWFWCP Report No. 199

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

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Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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Evaluation of the 1992 and 1993 Arctic grayling *(Thymallus arcticus)* Transplants to Little Calais Lake and Current Fish Population Status, 1998.

Watershed:	Nation River
Date of survey:	Aug 10 & 11, 1998
Field crew leader:	R.J. Zemlak
Field assistant:	A.R. Langston

Peace/Williston Fish and Wildlife Compensation Program

B. C. Hydro

and

Ministry of Environment, Lands and Parks

Report prepared by: A.R. Langston

INTRODUCTION

A reconnaissance level survey of Little Calais Lake (Figure 1) was completed by the Peace/Williston Fish and Wildlife Compensation Program (PWFWCP) in June of 1992 (McLean, 1992). The lake has a surface area of 15.6 ha (0.16 km^2), a maximum depth of 14.8 m and a mean depth of 5.5 m. For further lake data see the 1992 McLean report on file at the Ministry of Environment, Lands and Parks, and PWFWCP offices in Prince George.

In 1991 the Peace/Williston Fish and Wildlife Compensation Program proposed an experimental transplant of adult Arctic grayling *(Thymallus arcticus)* from a riverine habitat location to a protected small lake environment. The fish population status and available fish habitat of Little Calais Lake was assessed and documented in June of 1992 (McLean, 1992) by the Peace/Williston Fish and Wildlife Compensation Program. The intent of the 1992 study was to determine if Little Calais Lake was an appropriate location for a proposed transplanted population of Nation River Arctic grayling.

Little Calais Lake is head water to Calais Lake (Figure 1). A reconnaissance level survey of Calais Lake was completed by the Recreational Fisheries Branch in June of 1977 (Walsh and Hale). The fish population status and available fish habitat of Calais Lake was assessed and documented in June of 1992 (Langston and McLean, 1999) by the PWFWCP. The two lakes are connected by a small, low gradient 300 m long inlet stream (Albert Creek). Little Calais Lake was chosen as the site for an Arctic grayling transplant as opposed to Calais Lake. Little Calais Lake was selected for three reasons. Due to it's smaller size it was believed that any increases in the grayling populations resultant of the transplant would be easier to observe. The inlet (Albert Creek) of Little Calais Lake contained more of the habitat believed to be suitable for Arctic grayling spawning than the inlets of Calais Lake. Additionally, Little Calais Lake was further upstream in the watershed, reducing the likelihood of emigration of the transplanted Arctic grayling back to the Nation River.

Sixty two adult Arctic grayling were transplanted to Little Calais Lake from the Nation River in 1992. A further 25 adult Arctic grayling were transplanted from the Nation River to Little Calais Lake in 1993. A low effort attempt to capture Arctic grayling in Little Calais Lake was undertaken in 1996 (notes on file). The intent of the 1998 survey was to assess the current fish population of Little Calais Lake and determine if a grayling population had established.

Study Area

Location:	132 km north-west of Fort St. James (Figure 1)		
Elevation:	1030 m		
Latitude/Longitude:	$55^0$25'00":$125^0$23'13"	U.T.M.:	10.3489.61437
Management Unit:	7-28	N.T.S. Map No.:	93N/6 (edition 1)
Watershed Code:	273 - 7011 - 35500		
Water Body Identifier:	00452NATR		

Drainage: Albert C.--->Calais L.--->Albert C ---> Albert L.--->Albert C. ---> Electra L.--->Brule C.--->Nation R. —> Williston Reservoir (Parsnip Reach)—> Peace R.

METHODS

Three sinking "experimental" monofilament gillnets (total length 91.4 m, comprised of six 15.2 m long by 2.4 m deep panels), were set over night to determine relative abundance and identification of fish species in Little Calais Lake. Netting site #1 and #2 were set at the same locations as the 1992 and 1996 studies to facilitate comparison (Figure 2).

The benchmark was located and repainted (Figures 2). Any change in water level was measured using a Suunto clinometer, a two metre measuring pole and an Eslon tape.

The lake was accessed by helicopter. No road or trail access currently exists. A new logging road accessing Albert Lake reaches within 2 km of the south end of Calais Lake.

RESULTS & DISCUSSION

BENCHMARK

The benchmark set in 1992 was located. It was originally set June 9, 1992 two metres above lake level. The iron spike benchmark is set in a white spruce tree which is currently 35 cm in diameter and located 6.0 m from the lake shore. The benchmark was repainted. As of August 10, 1998 the benchmark was 2.09 m above lake level. This represents a 9 cm drop in water level as compared to the 1992 survey.

NETTING

The net at net site #1 (Figure 2) was set overnight from 10:15 hours to 10:00 hours of the next day for a total of 23 hours and 45 minutes (Table 1). The net was checked for fish presence at 11:15, and 16:15 hours. The net set at net site #2 (Figure 2) was set overnight from 10:30 hours to 12:15 hours of the next day for a total of 25 hours and 45 minutes (Table 2). The net was checked for fish presence at 11:30 and 19:30 hours. The net at net site #3 (Figure 2) was set overnight from 11:00 hours to 14:00 hours of the next day for a total of 27 hours (Table 3). The net was checked for fish presence at 13:20 hours on August 10. The three nets captured a combined total of 226 suckers *(Catastomus sp.)* and 131 rainbow trout *(Oncorhynchus mykiss)* (Table 4).

One hundred and five of the 131 rainbow trout captured were killed and sampled. Scale samples to facilitate age determination were collected from 53 of the sampled fish. Data was tabulated (Table 5) and analysed graphically (Figures 3 and 4). Figure 3 indicates the length weight relationship of the sampled fish. Weight as a function of length has been depicted by the power function Weight = 0.02 x Length$^{2.80}$ (Figure 3). Length at age results (Figure 4) indicate a "young" population with all but one specimen reported as age 3 or less. One fish (8 cm fork length) reported as age O by the consultants analysing the scale samples, was adjusted up to age 1 for analysis in this report. An 8 cm length age O rainbow trout in August is highly unlikely.

Figure 1. Little Calais Lake located 132 km north-west of Fort St. James, British Columbia

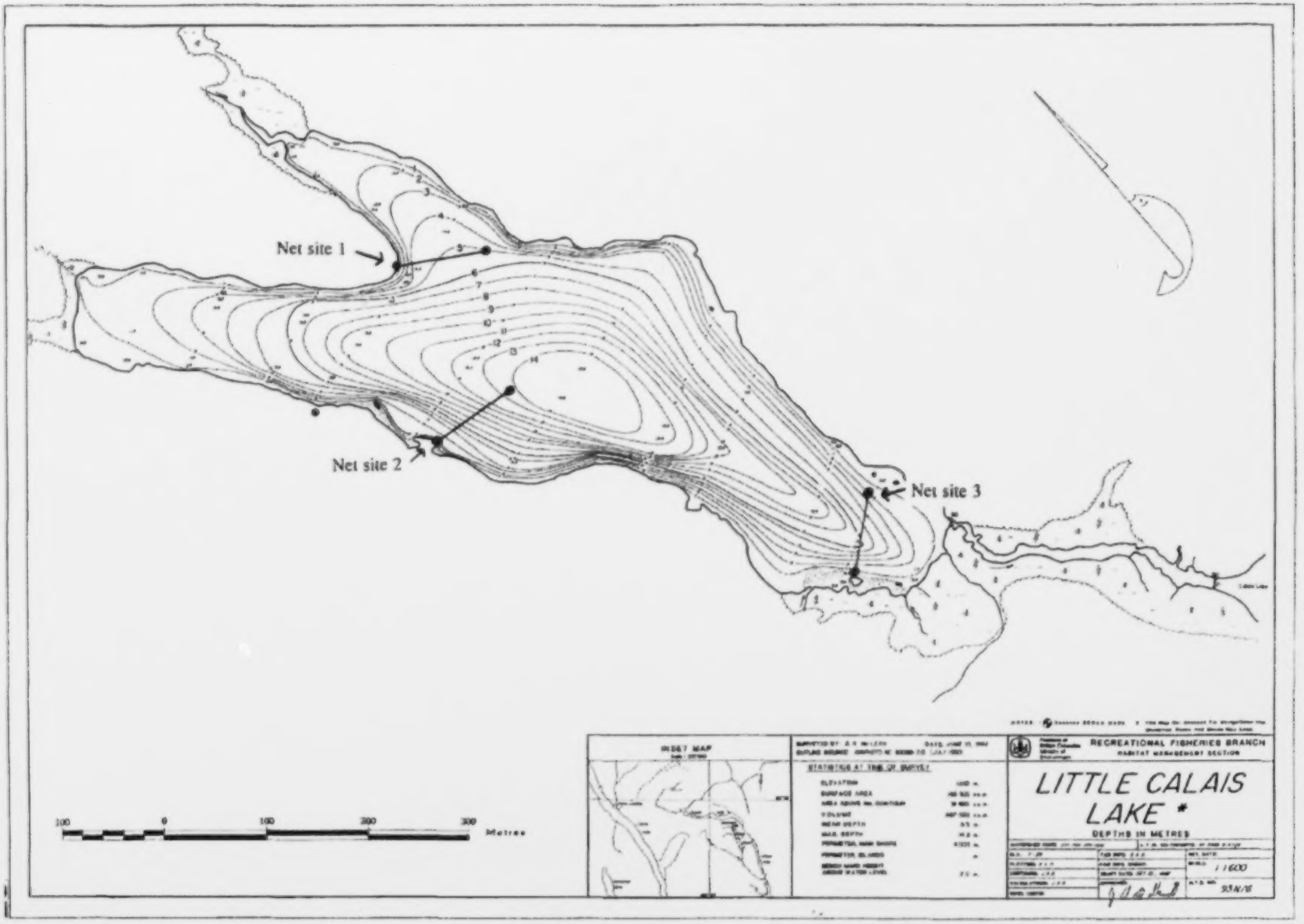


Figure 2. Little Calais Lake netting locations.

Examination of the data points on Figure 4 suggest some errors in age determination are quite possible. For this reason it is important to note that Table 5 which presents fish data by ages 1 to 4 should be used with caution. The last row which presents the information for the population sampled (105) is the most appropriate for discussion. The fish captured indicate the rainbow trout in Little Calais Lake are small with a mean length of 17 cm and weight of 65 g. The maximum length 30 cm and corresponding weight of 228 g is reflective of the indication that this is a young population. The condition factor (mean of 1.10) of the fish sampled also suggests that the population is not stunted, but simply young. Fifty two of the 53 fish examined for age were 3 years of age or less, the remaining fish was age 4. The 14 fish captured in the 1996 study were only sampled for fork length, and only a range (10 - 20 cm) of the sizes is available. The 1998 observed fork length range of 8 cm to 30 cm and age structure suggests rainbow trout have colonised Little Calais but the upper age classes are currently under represented. This irregularity should disappear within a few years.

Twenty six rainbow trout were not dead or badly injured when the nets were retrieved. Since it was apparent an appropriate sample size would be afforded by the fish which had expired in the gill nets, these 26 fish were not sampled and were released unharmed. Release of fish and selection of fish to collect scales from was performed in a random and unbiased manner. Individual fish data is contained in Appendix A.

Table 1. Details of netting effort at Netting Site #1.

Netting Site #1			
Type:	Sinking monofilament		
Date Set:	August 10, 1998	Time:	10:15 hrs
Date Lifted:	August 11, 1998	Time:	10:00 hrs
Net Dimensions:	Length:91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	1.2 m organics over cobble
Deep End Mesh Size:	64 mm	Depth: Substrate:	6.6 m unknown

Comments: (mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm)

Table 2. Details of netting effort at Netting Site #2.

Netting Site #2			
Type:	Sinking monofilament		
Date Set:	August 10, 1998	Time:	10:30 hrs
Date Lifted:	August 11, 1998	Time:	12:15 hrs
Net Dimensions:	Length:91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	0.8 m organics over cobble
Deep End Mesh Size:	64 mm	Depth: Substrate:	13.5 m unknown

Comments: (mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm)

Table 3. Details of netting effort at Netting Site #3.

Netting Site #3			
Type:	Sinking monofilament		
Date Set:	August 10, 1998	Time:	11:00 hrs
Date Lifted:	August 11, 1998	Time:	14:00 hrs
Net Dimensions:	Length:91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	0.8 m swd/ organics
Deep End Mesh Size:	64 mm	Depth: Substrate:	2.5 m unknown

Comments: (mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm)

Table 4. Lake Catch Summary

Species	Net Site No.				Angled	Other	Total	Number Sampled	Size Range (cm)
	1	2	3	4					
sucker (sp.)	120	34	72				226	-	12.3 - 45.2
rainbow trout	38	52	41				131	105	12.0 - 30.0

Table 5. Analysis of age distribution, length, weight and condition factor.

Age	Number	Length (cm)			Weight (g)			Condition Factor		
		Mean	Range	SD	Mean	Range	SD	Mean	Range	SD
1	26	14.0	8.0 - 17.7	1.9	31.1	6.0 - 62.4	11.8	1.09	0.93 - 1.20	0.10
2	15	22.2	15.4 - 26.8	3.3	119.6	41.3 - 193.5	45.3	1.04	0.90 - 1.10	0.10
3	11	27.0	24.9 - 28.1	1.2	180.1	142.7 - 212.6	22.6	0.91	0.82 - 0.97	0.10
4	1	30.0	-	-	227.6	-	-	0.84	-	-
all fish	105	17.0	8.0 - 30.0	5.3	64.7	6.0 - 227.6	60.2	1.10	0.82 - 1.74	0.10

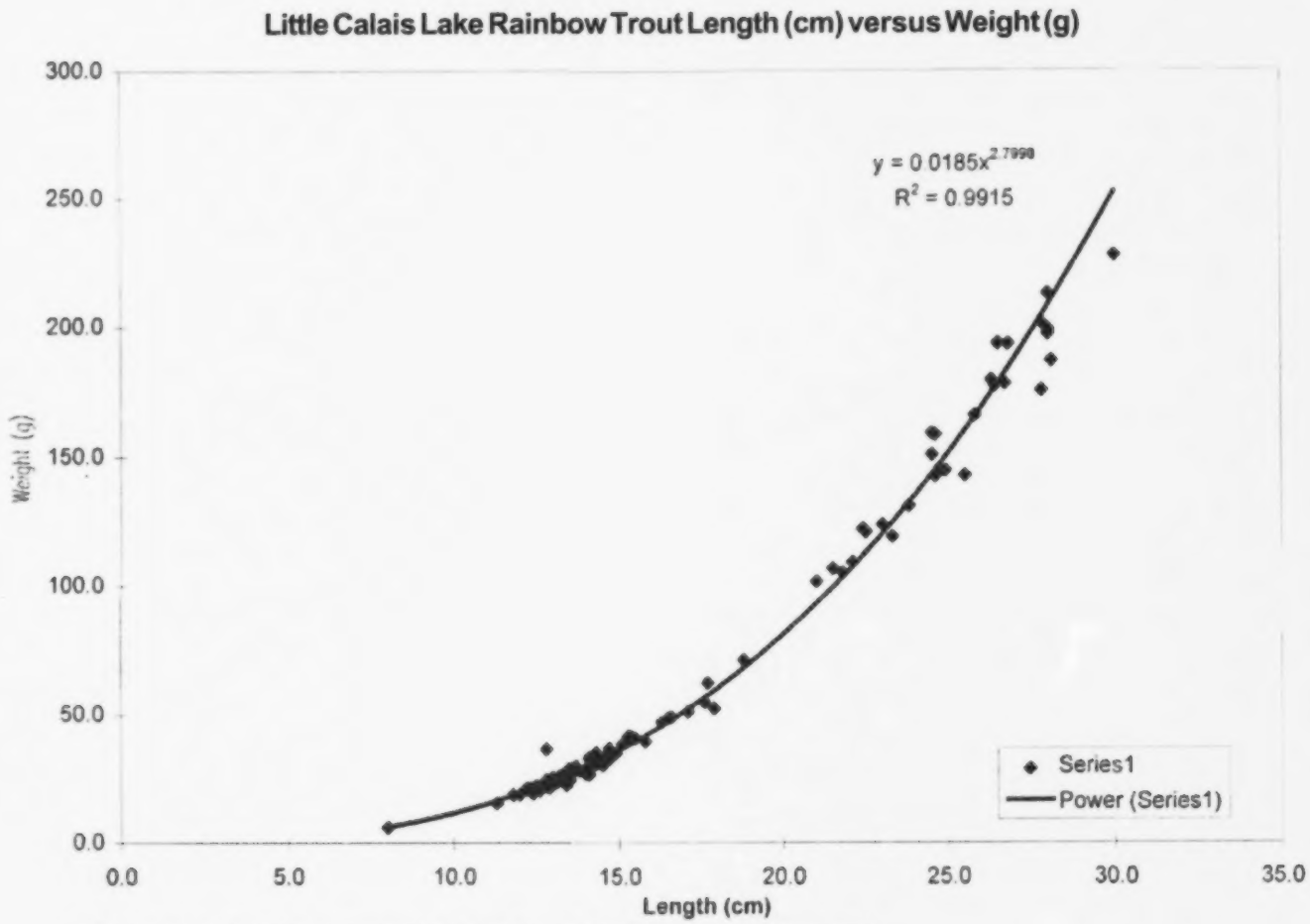


Figure 3. Fork length versus weight analysis of Little Calais Lake rainbow trout.

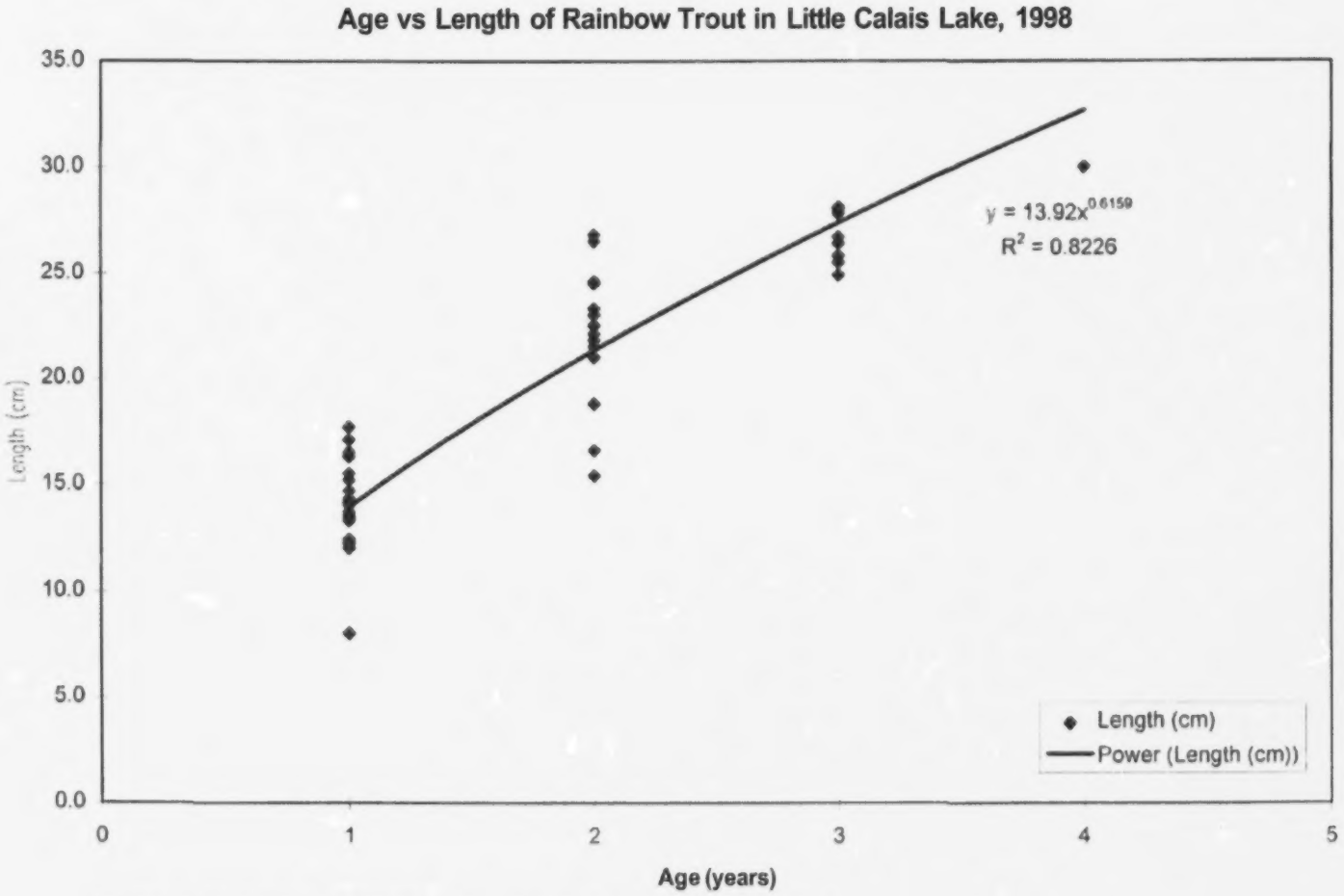


Figure 4. Age versus fork length analysis of Little Calais Lake rainbow trout.

FISHERIES MANAGEMENT COMMENTS

Little Calais Lake was evaluated in order to determine if the transplants of Arctic grayling had resulted in the establishment of a self sustaining population. Little Calais Lake was the site of transplants in 1992 and 1993, inevitably, some grayling would leave the lake system, potentially populating lakes (Calais, Albert, and Electra) and the Nation River further downstream (Figure 1). Little Calais Lake currently supports a population of longnose *(Catastomus catastomus)* and largescale *(Catastomus macrocheilus)* suckers and rainbow trout.

Little Calais Lake was gill netted (three short net sets of approximately 45 minutes each, Appendix B) in 1996. No Arctic grayling were captured. No Arctic grayling were captured in the gill nets set in Little Calais Lake in August 1998. In conjunction with this survey, Calais Lake was gill netted intensively, August 1998, (Langston, 1999) to determine if Arctic grayling had colonised that lake (Appendix C. Summary of the 1998 small lake evaluations of Calais and Little Calais lakes). No Arctic grayling were captured.

The 1992 and 1993 transplants of Arctic Grayling to Little Calais Lake did not result in resident populations in Little Calais Lake or Calais Lake. It is not known if the grayling were unable to adapt to the lake environment or if they migrated out of the system completely. Mike Stamford (University of British Columbia Masters candidate) has been analysing Williston Reservoir watershed Arctic grayling genetics as part of a separate study. His preliminary results suggest that Arctic grayling populating the Williston watershed are a "stream" variety of grayling. This genetically inherited trait to prefer flowing water would result in grayling emmigrating from their transplanted lake habitat to a stream. A local fishing guide (Tchentlo Lake Lodge owner) reported capturing Arctic grayling in the Nation River between Indata and Tchentlo lakes in 1993. The guide indicated he had not observed grayling in this location before. This reported occurrence may suggest the Arctic grayling migrated out of the transplant location back to the riverine habitat of the Nation River.

Previous reports (Walsh and Hale, 1977, and Langston and McLean, 1999) have reported the presence of both longnose and largescale suckers. The suckers captured in this study were not identified to species. Although some fish were definitely longnose suckers and others appeared to be largescale suckers, precise field identification of species was frequently impossible. Analysis of field data indicates both species are present. There appeared to be no small (less than 200 mm fork length) largescale suckers and no, or very few, large (greater than 300 mm fork length) longnose suckers.

Rainbow trout were not captured or observed in the 1992 surveys of Little Calais Lake and Calais Lake. Rainbow trout were captured in the 1996 netting work on Little Calais Lake. Calais Lake was not netted in 1996, however rainbow trout must have been present as they could not access Little Calais Lake without first inhabiting Calais Lake. The population of rainbow trout are resultant of the September 1991 stocking of 50,000 fall fry into Albert Lake. Albert Lake is approximately 2 km downstream of Calais Lake and connected by Albert Creek. Beaver dams are common on this creek, but are not barriers to upstream fish migration.

The recent colonisation by rainbow trout of Little Calais Lake is evidenced by the age structure of the population (Figure 4 and Appendix A). All but one of the rainbow trout were ages one to three, the remaining fish was four years old. This is indicative of new, and expanding, population. A naturalised rainbow trout population is establishing in Calais Lake.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

A reconnaissance level survey of Little Calais Lake was completed by the PWFWCP in June of 1992 (McLean, 1993). The report is on file at the Ministry of Environment, Lands and Parks, and PWFWCP offices in Prince George.

A survey (data on file, see Appendix B) to identify Arctic Grayling presence/ absence in Little Calais Lake was conducted in 1996 for the PWFWCP.

Other Related Surveys:

A reconnaissance level survey of Calais Lake was completed by the Recreational Fisheries Branch in June of 1977 (Walsh and Hale). The report is on file at the Ministry of Environment, Lands and Parks, and PWFWCP offices in Prince George.

A survey to assess current fish populations and fish habitat of Calais Lake was completed by the Peace/Williston Fish and Wildlife Compensation Program in 1992 (Langston, 1999). The survey was conducted to specifically determine if Calais Lake was a suitable location for an Arctic grayling transplant project.

A survey to assess current fish populations of Calais Lake was completed by the Peace/Williston Fish and Wildlife Compensation Program in 1998 (Langston, 1999). The survey was conducted to determine if a grayling population had developed in Calais Lake resultant of transplanting Arctic grayling to Little Calais Lake.

REFERENCES

Langston, A.R. and A.R. McLean. 1999. Fish Habitat Enhancement Potential and Current Fish Population Assessment of Calais Lake, 1992. Peace/Williston Fish and Wildlife Compensation Program Report No. 188. 13pp. plus appendices.

Langston, A.R. 1999. Calais Lake Fish Population Status, 1998. Peace/Williston Fish and Wildlife Compensation Program Report No. 189. 11pp. plus appendices.

McLean, A.R. 1993. A Reconnaissance Survey of Little Calais Lake. Peace/Williston Fish and Wildlife Compensation Program Report No. 112. 23pp. plus appendices.

Walsh and Hale. 1977. Unpublished lake survey data. Data on file at Ministry of Environment, Lands and Parks, Prince George office.

Appendix A

Individual Fish Data

Individual Fish Data

M- Male IM- Immature SP- Gravid
F- Female MT- Maturing ST- Spent
?- Not Obvious M- Mature R- Resting

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Age (yr)	Stomach Content	Comments
rainbow trout	8.0	6.0	?	IM	1	-	
rainbow trout	11.3	15.4	-	-		-	
rainbow trout	11.8	18.6	-	-		-	
rainbow trout	12.0	18.7	F	IM	1	caddis	
rainbow trout	12.2	21.0	M	MT	1	detritus/ insects	large testes
rainbow trout	12.3	20.1	-	-		-	
rainbow trout	12.3	20.3	-	-		-	
rainbow trout	12.3	21.0	M	MT	1	detritus	large testes
rainbow trout	12.4	19.2	?	IM	1	zooplankton	
rainbow trout	12.4	21.2	-	-		-	
rainbow trout	12.5	21.4	-	-		-	
rainbow trout	12.5	22.0	-	-		-	
rainbow trout	12.6	20.2	-	-		-	
rainbow trout	12.7	23.0	-	-		-	
rainbow trout	12.8	21.8	-	-		-	
rainbow trout	12.8	24.4	-	-		-	
rainbow trout	12.8	36.4	-	-		-	
rainbow trout	12.9	21.3	-	-		-	
rainbow trout	13.0	23.6	-	-		-	
rainbow trout	13.0	25.4	-	-		-	
rainbow trout	13.1	23.5	-	-		-	
rainbow trout	13.2	24.5	-	-		-	
rainbow trout	13.2	26.0	-	-		-	
rainbow trout	13.3	24.5	-	-		-	
rainbow trout	13.3	24.6	?	IM	1	zooplankton	
rainbow trout	13.3	26.4	-	-		-	
rainbow trout	13.3	26.5	F	IM	1	empty	
rainbow trout	13.3	26.5	-	-		-	
rainbow trout	13.4	22.4	?	IM	1	terrestrial insects	
rainbow trout	13.5	24.5	-	-		-	
rainbow trout	13.5	26.4	-	-		-	
rainbow trout	13.5	27.3	M	IM	1	empty	
rainbow trout	13.5	28.8	F	IM	1	zooplankton	
rainbow trout	13.6	28.6	-	-		-	
rainbow trout	13.6	29.1	-	-		-	
rainbow trout	13.7	28.6	-	-		-	
rainbow trout	13.7	28.8	F	IM	1	empty	

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Age (yr)	Stomach Content	Comments
rainbow trout	13.7	29.0	?	IM	1	zooplankton	
rainbow trout	13.7	29.9	M	IM	1	zooplankton	
rainbow trout	13.8	28.1	-	-		-	
rainbow trout	14.0	26.9	-	-		-	
rainbow trout	14.0	28.2	-	-		-	
rainbow trout	14.0	28.3	F	IM	1	detritus	
rainbow trout	14.0	29.1	-	-		-	
rainbow trout	14.1	26.7	F	IM	1	zooplankton	
rainbow trout	14.1	29.8	F	IM	1	empty	
rainbow trout	14.1	32.8	-	-		-	
rainbow trout	14.1	33.4	-	-		-	
rainbow trout	14.2	30.4	-	-		-	
rainbow trout	14.2	31.4	M	IM	1	zooplankton	
rainbow trout	14.3	30.7	M	IM	1	empty	
rainbow trout	14.3	32.9	-	-		-	
rainbow trout	14.3	35.2	?	IM	1	zooplankton	
rainbow trout	14.4	32.3	-	-		-	
rainbow trout	14.4	33.5	-	-		-	
rainbow trout	14.5	30.3	-	-		-	
rainbow trout	14.7	32.7	-	-		-	
rainbow trout	14.7	33.8	?	IM	1	empty	
rainbow trout	14.7	35.4	-	-		-	
rainbow trout	14.7	36.9	-	-		-	
rainbow trout	14.8	33.9	-	-		-	
rainbow trout	14.9	35.0	-	-		-	
rainbow trout	15.1	38.6	-	-		-	
rainbow trout	15.2	39.4	M	MT	1	tapeworms	large testes
rainbow trout	15.2	39.6	-	-		-	
rainbow trout	15.3	41.7	-	-		-	
rainbow trout	15.4	41.3	F	IM	2	detritus	
rainbow trout	15.5	40.8	M	IM	1	zooplankton	
rainbow trout	15.8	39.6	-	-		-	
rainbow trout	16.3	47.0	M	MT	1	empty	large testes
rainbow trout	16.5	48.7	F	IM	1	zooplankton	
rainbow trout	16.6	49.1	F	IM	2	zooplankton/ detritus	
rainbow trout	17.1	51.2	F	MT	1	empty	
rainbow trout	17.6	54.9	-	-		-	
rainbow trout	17.7	62.4	M	IM	1	zooplankton	
rainbow trout	17.9	52.5	-	-		-	
rainbow trout	18.8	71.2	M	IM	2	zooplankton/ insects	
rainbow trout	21.0	101.5	M	IM	2	empty	

SPECIES	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Age (yr)	Stomach Content	Comments
rainbow trout	21.5	106.5	F	MT	2	empty	
rainbow trout	21.8	104.8	F	MT	2	empty	
rainbow trout	22.1	109.0	F	IM	2	zooplankton/ insects	
rainbow trout	22.4	121.8	-	-		-	
rainbow trout	22.5	120.7	F	MT	2	zooplankton	
rainbow trout	23.0	123.5	F	IM	2	zooplankton	
rainbow trout	23.3	119.0	F	MT	2	empty	
rainbow trout	23.8	130.8	-	-		-	
rainbow trout	24.5	150.7	-	-		-	
rainbow trout	24.5	159.0	F	MT	2	zooplankton	tapeworms present
rainbow trout	24.6	142.4	M	IM	2	zooplankton/ mayfly	
rainbow trout	24.6	158.5	F	MT	2	zooplankton/ caddis fly	
rainbow trout	24.9	144.6	F	MT	3	zooplankton	
rainbow trout	25.5	142.7	M	MT	3	zooplankton/ rock	
rainbow trout	25.8	165.9	F	MT	3	empty	
rainbow trout	26.3	179.3	-	-		-	
rainbow trout	26.4	177.2	M	IM or R	3	empty	
rainbow trout	26.5	193.5	F	MT	2	zooplankton	
rainbow trout	26.7	178.1	M	MT	3	empty	
rainbow trout	26.8	193.2	M	MT	2	zooplankton/ insects	
rainbow trout	27.8	175.5	F	MT	3	zooplankton/ scud	
rainbow trout	27.8	201.4	M	MT	3	zooplankton	
rainbow trout	28.0	197.1	F	MT	3	detritus	
rainbow trout	28.0	198.9	F	MT	3	zooplankton/ mayfly/ rock	
rainbow trout	28.0	212.6	F	MT	3	fish/ zooplankton	
rainbow trout	28.1	186.9	F	MT	3	empty	
rainbow trout	30.0	227.6	F	MT	4	zooplankton	

Scale analysis and age data provided by North South Consultants, Winnipeg, Manitoba.

Appendix B

Unpublished First draft of "A Stocking Assessment of Unnamed Lake (Little Calais)"

Note- this first draft was not reviewed or accepted/ signed off. Therefore, reference to this draft and its contents should only be as data or notes on file.

A STOCKING ASSESSMENT OF

UNNAMED LAKE (LITTLE CALAIS)

WATERSHED:	Nation River
DATE OF SURVEY:	July 15, 1996
FIELD CREW LEADER:	Mark Hunter
FIELD ASSISTANT:	Karin Mathias
REPORT PREPARED BY:	Mark Hunter

BRITISH COLUMBIA CONSERVATION FOUNDATION

PEACE / WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

FUNDED BY: FOREST RENEWAL BRITISH COLUMBIA

RELEASED BY: _____

D. J. Cadden, Regional Fisheries Biologist

INTRODUCTION

A standard fisheries baseline reconnaissance of Little Calais Lake was carried out by the Peace / Williston Fisheries Compensation Program in July of 1992. It was determined that the lake sustained populations of longnose suckers and large scale suckers, and that the lake could support a sport fish population. The report is on file at the Ministry of Environment, Fish and Wildlife Branch, Prince George.

The lake was stocked later the same year with Arctic grayling transplanted from the Nation River downstream of Chuchi Lake. A second transplant occurred in July, 1993. The purpose of this was to try to establish a lake resident population of Arctic grayling that could be protected, and later be used as a source for future Arctic grayling stocking in the Nation River watershed.

A stock assessment was carried out on Little Calais Lake in 1996 to determine whether a resident population had become established in the lake, and to monitor the health and productivity of the Arctic grayling population.

STOCKING HISTORY

Little Calais Lake Stocking History

Year	Species	Number	Stock
1993	AG	25	Nation River
1992	AG	58	Nation River

LOCATION

Location:	approximately 130 northwest of Fort St. James		
Elevation:	1025 m		
Latitude/Longitude:	522500:1252313	U.T.M.:	10.3489.61437
Management Unit:	7-28	N.T.S. Map No.:	93 n6

Drainage: Unnamed C. ---> Calais L. ---> Unnamed C. ---> Albert L. —> Unnamed C. —> Electra L. —> Brule C. ---> Nation R. —> Williston Reservoir (Parsnip Reach) --->PeaceR.

PREVIOUS SURVEYS

July 9-10, 1992 McLean, A. R., Peace / Williston Compensation Project, B. C. Hydro Environmental Resources, and B.C. Environment, Fish and Wildlife Branch, Prince George, B.C. A Reconnaissance Survey of Unnamed Lake (Little Calais Lake)

FISHERIES MANAGEMENT COMMENTS

No Arctic grayling were caught in any of the net sets or minnow Gee traps.

A total of 11 rainbow trout were caught in the 3 experimental monofilament gill nets. As well, three rainbow trout were caught in five fishing person-hours using a fly rod and a spin-cast rod. No fish were caught in the two minnow Gee traps. No rainbow trout were reported to have been caught in the lake during the initial lake survey. The rainbow trout most probably migrated upstream from nearby Calais Lake after 1992.

NETTING RECORD

Mesh Size Experimental Order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 1

Type:	Sinking Monofilament Gill Net			
Date Set:	July 15, 1996		Time:	1535 hrs
Date Lifted:	July 15, 1996		Time:	1615 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	2.0 m
			Substrate:	boulders
Deep End Mesh Size:	64 mm		Depth:	5.0 m
			Substrate:	organics over cobble / boulder

Comments: Net was set in the same location as Net Set # 2 in 1992. Four longnose suckers were caught.

NETTING SITE # 2

Type:	Sinking Monofilament Gill Net			
Date Set:	July 15, 1996		Time:	1620 hrs
Date Lifted:	July 15, 1996		Time:	1730 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	2.0 m
			Substrate:	boulders
Deep End Mesh Size:	64 mm		Depth:	4.0 m
			Substrate:	organics over cobble / boulder

Comments: Two rainbow trout and fourteen longnose suckers were caught.

NETTING SITE # 3

Type:	Sinking Monofilament Gill Net			
Date Set:	July 15, 1996		Time:	1740 hrs
Date Lifted:	July 15, 1996		Time:	1825 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	2.0 m
			Substrate:	boulders
Deep End Mesh Size:	64 mm		Depth:	10.0 m
			Substrate:	organics over cobble /boulder

Comments: Nine rainbow trout were caught.

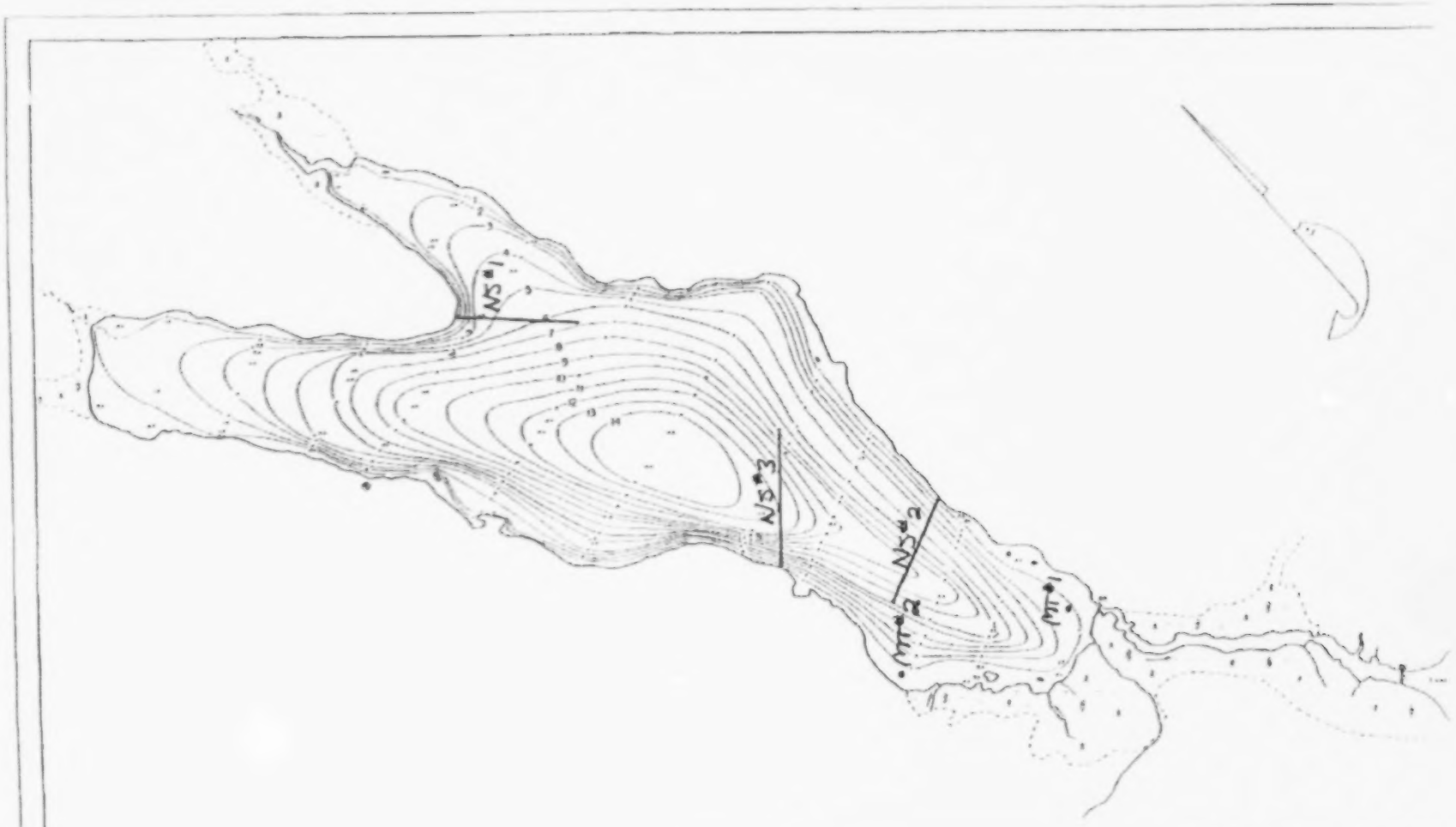
LAKE CATCH SUMMARY

Species	Netting Site			Angled	Other	Total	Number Sampled	Number Preserved	Size Range (cm)
	No. 1	No. 2	No. 3						
RB	0	2	9	3	0	14	0	0	10.0 - 20.0
LSU	4	14	0	0	0	18	0	0	10.0 - 16.0

Minnow Traps:

Bait: Sardines

Trap No.	Hours	Depth (m)	Substrate	Species	No. Caught	Size Range (cm)
1	2:02	1.1	organics / silt with LWD	empty	0	-
2	2:01	0.9	organics / silt	empty	0	-



Reduced to
33%
of Original

INDEX MAP

RECREATIONAL FISHERIES BRANCH

LITTLE CALAIS LAKE

DEPTHS IN METRES

Appendix C

Summary of the 1998 small lake evaluations of Calais and Little Calais lakes.

Peace/Williston
FISH & WILDLIFE COMPENSATION PROGRAM

1011 Fourth Avenue, 3rd Floor
Prince George, BC V2L 3H9

August 17, 1998 **File #;34020-20/ PWFWCP/ Little Calais Lake**

RE: Small Lake Evaluations *Little Calais and Calais Lakes* (Project 99-17)

Little Calais Lake and Calais Lake are located in Management Unit 7-28 approximately 150 km west of Mackenzie and 133 km north of Fort St. James. The outlet system of these lakes is tributary to the Nation River. The outlet system enters the Nation River between Indata and Tchentlo Lake (Nation Lakes).

Little Calais Lake (surface area 15.7 ha) was targeted as a potential site for an Arctic grayling transplant from the Nation River. The goal was to create an Arctic grayling "refuge" population. The outlet of Little Calais Lake flows approximately 300 m. to Calais Lake (surface area 121.9 ha). Migration of transplanted fish out of Little Calais Lake was possible, therefore both lakes were examined. Little Calais Lake was studied at the Reconnaissance level by the Peace/Williston Fish and Wildlife Compensation Program (PWFWCP) in 1992. Sixty two adult Arctic grayling were transplanted to Little Calais in 1992. An additional 25 were transplanted in 1993. A one day gill netting survey was done in 1996, no Arctic grayling were captured. Calais Lake was studied at the Reconnaissance level by the Ministry of Environment Fisheries Branch in 1977. A Stock Assessment study was done by the PWFWCP in 1992. The main objective of the 1998 evaluations is to determine if the Arctic grayling transplants were successful in creating a "refuge" population.

Little Calais Lake: Three sinking monofilament "experimental" gill nets (300 foot length consisting of six different mesh size panels) were set over night for a combined total of 76.5 hours. No Arctic grayling were captured. The small inlet stream was examined along its fish accessible length for juvenile grayling. No grayling were observed.

Calais Lake: Three sinking monofilament "experimental" gill nets were set over night for a combined total of 68 hours. No Arctic grayling were captured.

No Arctic grayling were observed during this survey. An Arctic grayling refuge population has not been created. The Arctic grayling may have emigrated downstream to Albert and Electra Lake, or farther to Tchentlo Lake and the Nation River. A fishing guide reported capturing a grayling in the Nation River between Indata and Tchentlo Lake in 1994. He claimed he had not observed grayling in this location before. It is possible this was one of the transplanted fish. The total distance migrated would be approximately 35 km, a distance easily achievable for grayling. The impressive component of such a migration, if it did occur, is that the 35 km encompasses three lakes and numerous beaver dams along a small outlet system. A future (1999) evaluation of the fish species present in Albert and Electra Lake may be warranted.

The gill netting did identify a rainbow trout population in both lakes. No rainbow trout were observed in the 1977 and 1992 surveys. Rainbow trout were captured in the 1996 Little Calais survey. These fish are likely upstream migrants from the one time stocking (1991) of 50,000 rainbow trout into Albert Lake (one km downstream of Calais Lake). The rainbow trout in both lakes appear "stunted". The biggest fish was 527 g.

The sucker population in both lakes is very difficult to identify to species. All previous studies have identified both coarse scale and longnose suckers present in the lakes. Using scale numbers along diagonal line originating from dorsal fin (16) it appears that all suckers in the lakes are longnose suckers. Other means of distinguishing between the species (mouth shape, dorsal fin rays, position of eye, length of nose, etc.) were not decisive.

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BRITISH COLUMBIA